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**EPIDEMIOLOGY OF INFECTION WITH BOVINE VIRAL DIARRHOEA VIRUS  
IN A DAIRY HERD.**

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A THESIS PRESENTED IN PARTIAL FULFILMENT  
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## Abstract

This thesis describes studies on epidemiological aspects of infection of a dairy herd with bovine viral diarrhoea virus. Serum neutralizing antibodies were measured and isolation of virus was attempted from animals in one commercial dairy farm and from bobby calves collected from dairy farms in the Manawatu Region for slaughter at a local abattoir.

The work is presented in six chapters. The first chapter is a review of the literature relevant to the present work. The second is a description of the general materials and methods. The third, fourth and fifth give the results of the investigations carried out and the sixth is summary, a general discussion and conclusion of the major findings. References are cited at the end of the thesis. Appendices I and II describe the preparation of the media for cell culture, reagents and solutions, and publications related to the work.

All of the replacement heifers and 97.1% of the adult milking herd had serum neutralizing antibodies to bovine viral diarrhoea virus. There was no significant difference ( $p > 0.05$ ) in the geometric mean titres of each age group of the animals in the herd.

The serum antibody titres of the cohort of one to four day old calves reflected those of their dams and declined steadily, with a half life of 25 days, so that by eight months of age, all calves tested negative. The serum neutralizing antibody titres in a group of bobby calves at a local abattoir were significantly lower ( $p < 0.001$ ) than those of the cohort of calves on the farm.

Bovine viral diarrhoea virus was isolated from blood samples from 21 of 340 (6.1%) animals and five (1.4%) of these animals were still infected when retested 12 months later. The distribution of serum neutralizing antibodies in infected animals ranged from  $< 0.6$  to 2.7. Three of the persistently infected animals had no detectable neutralizing antibodies (titres  $< 0.6$ ) but two had titres of 0.9 and 1.8. The age of the infected animals ranged from one to more than eight years.

Persistently infected animals provided an adequate mechanism for the maintenance of bovine viral diarrhoea virus in the herd. It is postulated that

animals, in contact with persistently infected animals, may be reinfected when their antibody titres decline below protective levels.

The viral interference assay and fluorescent antibody test were used to detect virus in cultures of blood samples. These two methods were evaluated for sensitivity and specificity and appeared to be equally suitable for virus isolation. In the present work there was 88.4% agreement between the two tests, while the viral interference assay was found to be relatively more sensitive but less specific than the fluorescent antibody test.

The results of this work indicate that infection with bovine viral diarrhoea virus is endemic on the farm studied and that most animals become infected by the time they are twelve months old. However, depending on the particular management practices used, some groups of heifer calves may not be exposed to virus before they reach breeding age. It also appears that infection with bovine viral diarrhoea virus is common on many dairy farms in the Manawatu Region. If identification and elimination of persistently infected animals is an option for the control of bovine viral diarrhoea virus in an endemically infected population, a laboratory test with high specificity and sensitivity and which is easy to perform will be required.

If eradication of BVDV from the farm is not practical then immunization of heifers around the age of 12 months, either by exposure to persistently infected animals in the herd or by using inactivated vaccines, may protect them against infection during the first breeding period thus minimizing foetal infection.

**STATEMENT**

This is to certify the work on which this thesis is based has not been accepted in whole or in part for any other degree or diploma, and was carried out by the undersigned. Assistance received is specifically recorded in the Acknowledgements section bound with the thesis.



**Abraham Gopilo Golo**  
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